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ART UNIT	PAPER NUMBER
2613	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/537,171	SASAI, HIROYUKI	
	Examiner	Art Unit	
	Shi K. Li	2613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 March 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7 and 13-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 13-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11/03/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-7 are 13-19 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 1 recites the limitation "converts a frequency of an electrical signal in the received optical signal by using intensity modulation" in lines 10-11 of the claimed. Instant specification does not describe the limitation in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 13 recites the limitation "converting a frequency of an electrical signal in the received optical signal by using intensity modulation" in lines 10-11 of the claimed. Instant specification does not describe the limitation in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-7 are 13-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "an electrical signal in the received optical signal" in line 10 of the claim. An optical signal is a signal with wavelength in optical range (less than 50 μm) while an electrical signal is a signal that is represented by an electrical current or electrical voltage. Since an optical signal does not have an electrical voltage or an electrical current, it is unclear how to interpret the limitation.

Claim 13 recites the limitation "an electrical signal in the received optical signal" in line 10 of the claim. An optical signal is a signal with wavelength in optical range (less than 50 μm) while an electrical signal is a signal that is represented by an electrical current or electrical voltage. Since an optical signal does not have an electrical voltage or an electrical current, it is unclear how to interpret the limitation.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-4 and 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chew et al. (U.S. Patent 7,260,330 B2) in view of Trinh (U.S. Patent 6,822,743 B2) or Kersey et al. (U.S. Patent 5,410,404).

Regarding claim 1, Chew et al. teaches in FIG. 4 an optical transmission system comprising an optical transmitter 100, an optical receiver 102 and an optical fiber 117. The optical transmitter converts an electrical signal (binary data source 108) to an optical signal. The optical receiver comprises a correlation modulator for intensity-modulating the received optical signal and an interferometer for splitting the signal into two optical signals one for each photodetector of the dual photodetectors 124. Chew et al. teaches in col. 7, lines 50-57 that the two optical signals are antiphase. Chew et al. teaches dual detectors 124 for converting the two optical signals into electrical signals and differential amplification on electrical signal (see balance detector of FIG. 2, which is similar to the dual detectors of FIG. 4). The difference between Chew et al. and the claimed invention is that Chew et al. does not teach first and second optical transmission lines for connecting the two optical signals to the dual detectors. Official Notice was taken in the Office Action dated 10 September 2008. Applicant has requested the Examiner to provide documentary evidence. Examiner cites Trinh or Kersey et al. for providing such teaching. Trinh teaches in FIG. 7 the use of fibers 711 and 712 for connecting to the photodetectors 715 and 716. Kersey et al. teaches in FIG.1 a detector wherein fibers 52 and 54 are used for connecting coupler 22 and 24 to photodetectors 72 and 74. One of ordinary skill in the art would have been motivated to combine the teaching of Trinh and Kersey et al. with the optical transmission system of Chew et al. because fibers are flexible and small in size and have low loss for conveying optical signals. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use fibers, as taught by Trinh or Kersey et al., in the optical transmission system of Chew et al. because fibers are flexible and small in size and have low loss for conveying optical signals.

Regarding claim 2, Chew et al. teaches in FIG. 4 modulator 112 for receiving electrical signals and converting the electrical signal into an optical signal.

Regarding claim 3, Chew et al. teaches in FIG. 4 modulator 118 for modulating the optical signal. Trinh and Kersey et al. teach differential amplifier for combining the electrical signals of dual detectors.

Regarding claim 4, Chew et al. teaches in col. 7, lines 30-31 Mach-Zehnder modulator.

Regarding claims 13-14, Chew et al. and the Official Notice teach all the limitations of the claim.

Regarding claim 15, Chew et al. teaches in FIG. 4 modulator 118 for modulating the optical signal, interferometer for separating the modulated optical signal.

Regarding claim 16, Chew et al. teaches in col. 7, lines 30-31 Mach-Zehnder modulator.

3. Claims 5 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chew et al., Trinh and Kersey et al. as applied to claims 1-4 and 13-16 above, and further in view of Kuri et al. (U.S. Patent Application Pub. 2003/0198477 A1).

Chew et al., Trinh and Kersey et al. have been discussed above in regard to claims 1-4 and 13-16. The difference between Chew et al., Trinh and Kersey et al. and the claimed invention is that Chew et al. does not teach using oscillators of different frequency in the transmitter and the receiver. Kuri et al. teaches in FIG. 2 an optical transmission system. Kuri et al. teaches that if the desirable output frequency at the receiver if f_{IF}, a local oscillator of f_{RF} and a local oscillator of $f_{LO/2}$ can be used in the transmitter and the receiver, respectively. Note that the terms RF and IF are used in Kuri et al. to indicate different frequencies and both of them are in the radio frequency range. Similarly, the claim language requires that the frequency of the

intermediate frequency is different from a frequency of a radio frequency signal. One of ordinary skill in the art would have been motivated to combine the teaching of Kuri et al. with the modified optical transmission system of Chew et al., Trinh and Kersey et al. because by choosing appropriate frequencies for the modulated signals, certain undesirable effect of the transmission can be avoided. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use different frequencies for modulated signals, as taught by Kuri et al., in the modified optical transmission system of Chew et al., Trinh and Kersey et al. because by choosing appropriate frequencies for the modulated signals, certain undesirable effect of the transmission can be avoided.

4. Claims 6-7 and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chew et al., Trinh and Kersey et al. as applied to claims 1-4 and 13-16 above, and further in view of Pua et al. (U.S. Patent 6,647,176 B1).

Chew et al., Trinh and Kersey et al. have been discussed above in regard to claims 1-4 and 13-16. The difference between Chew et al., Trinh and Kersey et al. and the claimed invention is that Chew et al., Trinh and Kersey et al. do not teach a polarization scrambler. Pua et al. teaches in FIG. 1 a transmission system with polarization compensation. FIG. 1 of Pua et al. includes a polarization scrambler for scrambling the state of polarization of the optical signal so that the signal is insensitive to any polarization dependent effects of the fiber 106. One of ordinary skill in the art would have been motivated to combine the teaching of Pua et al. with the modified optical transmission system of Chew et al., Trinh and Kersey et al. because polarization scrambler scrambling the state of polarization of the optical signal so that the signal is insensitive to any polarization dependent effects of the fiber 106. This makes the polarization compensation

effective. Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to include polarization scrambler, as taught by Pua et al., in the modified optical transmission system of Chew et al., Trinh and Kersey et al. because polarization scrambler scrambling the state of polarization of the optical signal and makes the polarization compensation effective.

Response to Arguments

5. Applicant's arguments filed 9 March 2009 have been fully considered but they are not persuasive.

The Applicant argues that Chew does not teach the two optical signals to the two photodetectors are antiphase. The Examiner disagrees. Chew et al. teaches in col. 7, lines 50-57 that the two optical signals are antiphase. In particular Chew et al. teaches that the interferometer causes the signal from one bit interval to combine with the signal from a delayed bit interval in such a way that if the signals from both bit intervals are of the same polarity, optical power is sent to one of the dual photodetectors 124 but not the other, but if the signals from the two bit intervals are of opposite polarity, optical power is sent to the other one of the dual photodetectors. That is, when the signal to one photodetector is a maximum, the signal to the other photodetector is zero. Therefore, the two optical signals are antiphase.

The Applicant argues "Common sense would not lead one of ordinary skill in the field of high-speed optical communication systems to combine Kuri with Chew. First, Kuri and Chew are each directed to different applications of optical communications. Kuri discloses a system with an optical transmission rate of 155.52 Mb/s (Para. 0031), and which aims to increases signal

reception sensitivity and reduce the effects of wavelength dispersion of the optical fiber. (Para. 0008)."

"On the other hand, the specific teaching of Chew is to provide "a high data rate optical communication system that approaches the theoretical performance limit" (Column 2, Lines 53-56) and is for use in "ultra-high-speed 100 Gb/s-class all-optical networks." (Column 1, Lines 9-12)."

"A hypothetical combination of Chew and Kuri would result in a drastic reduction of the high-transfer speed as disclosed in Chew, and would hinder the goal of approaching the theoretical performance limit."

"Applicant submits that any combination of references that must be modified beyond their express functions is suggestive of an unintended use of hindsight that may have been utilized to drive the present rejection. This is particularly true for an examiner who is attempting to provide a diligent effort that only patentable subject matter occurs. The KSR Guidelines do not justify such an approach. There is still a requirement for the Examiner to step back from the zeal of the examination process and to appreciate that a Patent Examiner has to wear both hats of advocating a position relative to the prior art while at the same time objectively rendering in a judge-like manner a decision on the patentability of the present claims."

While the Examiner greatly appreciates the Applicant's advice on how to examine patent applications, he must disagree with Applicant's technical analysis of the references. Chew et al. suggests in col. 1, lines 11-12 100-Gbps-call all-optical networks. Chew et al. also teaches in col. 6, lines 35-36 that the modulator 112 may encode 10 Gigabits per second (Gbps) of data. It is understood that a network may comprise a plurality of channels. While each channel carries

10 Gbps, the network has higher bandwidth than each individual channel. The system of Kuri et al. transmits a RF signal. The RF signal itself is of 59.6 GHz (see FIG. 6) even though it carries a data with data rate of 155.52 Mb/s. The Examiner recognizes that the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

The Applicant argues "Secondly, Kuri teaches away from Chew. Kuri states "an optical detector...has a low receiver sensitivity and relatively high noise index, so there is no need to use [optical detectors]." (Para. 0032). On the other hand, Chew requires dual photodetectors 124 in the receiver 102. One of ordinary skill in the art of optical communication systems would not utilize Chew's receiver with photodetectors in the communication system of Kuri which calls for a receiver with no photodetectors." The Examiner disagrees. Kuri et al. teaches in paragraph [0032] "To wit, an optical detector or radiofrequency electrical element with a radiofrequency response typically has a low receiver sensitivity and relatively high noise index, so there is no need to use **them** and thus a superior optical communications system with high receiver sensitivity can be constructed." The pronoun "them" refers to "optical detector or radiofrequency electrical element with a radiofrequency response". Kuri et al. converts the information sideband from RF to IF and can use "optical detector or intermediate frequency electrical element with an intermediate frequency response".

Conclusion

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shi K. Li whose telephone number is 571 272-3031. The examiner can normally be reached on Monday-Friday (6:30 a.m. - 4:00 p.m.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Vanderpuye can be reached on 571 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

skl
20 May 2009

/Shi K. Li/
Primary Examiner, Art Unit 2613